

What is Claimed Is:

- [c1] 1.A method of monitoring and scheduling tasks in an operating system, the method comprising the steps of:
- obtaining task information relating to tasks processed in the operating system;
- generating a user interface based on the obtained task information, the user interface displaying parameters related to the task information;
- determining loading of the operating system based on the user interface; and
- adjusting the scheduling of tasks based on the loading of the operating system.
- [c2] 2.The method according to claim 1, wherein the operating system includes a tool and a controller, and the tasks are processed in the controller and the user interface is generated by the tool.
- [c3] 3.The method according to claim 1, the method further including the step of representing processing time using a system of charts.
- [c4] 4.The method according to claim 3, wherein the system of charts includes a plurality of charts.
- [c5] 5.The method according to claim 4, wherein the plurality of charts includes:
- a primary chart having eight primary time slices, each of the primary time slices representing a time duration;
- a secondary chart having eight secondary time slices, each of the secondary time slices representing a time duration eight times as long as the time duration represented by each primary time slice; and
- a tertiary chart having eight tertiary time slices, each of the tertiary time slices representing a time duration eight times as long as the time duration represented by each secondary time slice.
- [c6] 6.The method according to claim 5, wherein the step of adjusting the scheduling of tasks includes moving a task from one of the primary chart, secondary chart or tertiary chart to another of the primary chart, secondary chart, or tertiary chart.
- [c7] 7.The method according to claim 5, wherein the step of adjusting the scheduling of tasks includes moving a task from one set of time slices of the

primary chart, secondary chart or tertiary chart to another set of time slices of the same primary chart, secondary chart, or tertiary chart.

[c8] 8.The method according to claim 7, wherein the moving a task from one set of time slices of the primary chart, secondary chart or tertiary chart to another set of time slices of the primary chart, secondary chart, or tertiary chart is performed using skewing of the task.

[c9] 9.The method according to claim 5, wherein the user interface generates profiles of each of the plurality of charts for each of the eight time slices in each respective chart.

[c10] 10.The method according to claim 9, wherein the profile for each of the eight time slices in each chart includes at least one selected from the group consisting of number of tasks in the time slice, overruns, and execution time for each chart.

[c11] 11.The method according to claim 10, wherein the method further includes the steps of:
selecting a time slice within one of the plurality of charts; and
generating a detailed profile of that selected time slice.

[c12] 12.The method according to claim 11, wherein the detailed profile includes at least one selected from the group consisting of execution order of a task, scheduled rate, last run time, minimum run time and maximum run time.

[c13] 13.A method of monitoring and scheduling tasks in an operating system, the method comprising the steps of:
obtaining task information relating to tasks processed in the operating system;
generating a user interface based on the obtained task information, the user interface displaying parameters related to the task information, the task information based on a system of charts, the system of charts including a plurality of charts;
determining loading of the operating system based on the user interface; and
adjusting the scheduling of tasks based on the loading of the operating system, wherein the operating system includes a tool and a controller, and the tasks are

processed in the controller and the user interface is generated by the tool.

[c14] 14.The method according to claim 13, wherein the plurality of charts includes:
a primary chart having eight primary time slices, each of the primary time slices representing a time duration; and
a secondary chart having a predetermined number of secondary time slices,
each of the secondary time slices representing a time duration the
predetermined number times as long as the time duration represented by each
primary time slice.

[c15] 15.The method according to claim 14, wherein the step of adjusting the
scheduling of tasks includes moving a task from one of the primary chart or
secondary chart to another of the primary chart or secondary chart.

[c16] 16.The method according to claim 14, wherein the step of adjusting the
scheduling of tasks includes moving a task from one set of time slices of the
primary chart or secondary chart to another set of time slices of the same
primary chart or secondary chart using skewing of the task.

[c17] 17.The method according to claim 14, wherein the user interface generates
profiles of each of the plurality of charts for each of the time slices in each
respective chart, the profile for each of the time slices in each chart includes at
least one selected from the group consisting of number of tasks in the time
slice, overruns, and execution time for each chart, and wherein the method
further includes the steps of:

selecting a time slice within one of the plurality of charts; and

generating a detailed profile of that selected time slice; and

wherein the detailed profile includes at least one selected from the group
consisting of execution order of a task, scheduled rate, last run time, minimum
run time and maximum run time.

[c18] 18.A system for monitoring and controlling the scheduling of tasks in a task
portion, the system comprising:
a profiler portion, the profiler portion including:
a task monitor portion that obtains task information from the task

portion;

a user interface generation portion that represents the task information to a user on a display; and

a task adjustment portion that adjusts parameters of tasks, based on the input of the user, in the task portion to control processing loading of the task portion.

- [c19] 19.The system according to claim 18, wherein the user interface generation portion includes:
- a charts/slices display portion for generating information on the display relating to charts and slices and the loading of tasks on the charts and slices; and
- a tasks display portion for generating information on the display relating to parameters of tasks.
- [c20] 20.The system according to claim 18, wherein the task portion is in a controller device, and the profiler portion is in a control systems tool.
- [c21] 21.The system according to claim 20, wherein the controller device and the control systems tool are connected to each other over a communications network.
- [c22] 22.The system according to claim 21, wherein the controller device includes a controller countdown timer portion, and the control systems tool includes a tool replenishment timer portion, the tool replenishment timer portion replenishing the controller countdown timer portion so long as the controller device and the control systems tool are in communication, and wherein the controller device sends task information to the control systems tool so long as the controller countdown timer portion is not expired.
- [c23] 23.The system according to claim 18, wherein the user interface generation portion, based on information from the task monitor portion, represents processing time using a system of charts, the system of charts including a plurality of charts.
- [c24] 24.The system according to claim 23, wherein the plurality of charts includes a primary chart having primary time slices and a secondary chart having

secondary time slices, wherein tasks on the primary chart receive priority over tasks on the secondary chart, and wherein the user interface generation portion displays task information based on the primary chart and secondary chart.

[c25] 25.The system according to claim 24, wherein the plurality of charts further includes a tertiary chart having tertiary time slices, wherein tasks on the secondary chart receive priority over tasks on the tertiary chart, and wherein the user interface generation portion displays task information based on the primary chart, secondary chart and tertiary chart.

[c26] 26.The system according to claim 25, wherein each of the primary time slices represents a time duration, each of the secondary time slices represents a time duration eight times as long as the time duration represented by each primary time slice, and each of the tertiary time slices representing a time duration eight times as long as the time duration represented by each secondary time slice.

[c27] 27.The system according to claim 25, wherein the task adjustment portion adjusts the loading of a task by moving a task from one of the primary chart, secondary chart or tertiary chart to another of the primary chart, secondary chart, or tertiary chart.

[c28] 28.The system according to claim 25, wherein the task adjustment portion adjusts the loading of a task by moving a task from one set of time slices of the primary chart, secondary chart or tertiary chart to another set of time slices of the same primary chart, secondary chart, or tertiary chart.

[c29] 29.A system for monitoring and controlling the scheduling of tasks in a task portion, the system comprising:
 a profiler portion, the profiler portion including:
 a task monitor portion that obtains task information from the task portion;
 a user interface generation portion that represents the task information to a user on a display, the user interface generation portion, based on information from the task monitor portion representing processing time using a system of charts, the system of charts including a plurality of

charts, the user interface generation portion including:

a charts/slices display portion for generating information on the display relating to charts and slices and the loading of tasks on the charts and slices; and

a tasks display portion for generating information on the display relating to parameters of tasks; and

a task adjustment portion that adjusts parameters of tasks, based on the input of the user, in the task portion to control processing loading of the task portion; and

wherein the task portion is a controller device, and the profiler portion is in a control systems tool, the controller device and the control systems tool being connected to each other over a communications network.

[c30] 30.The system according to claim 29, wherein the controller device includes a controller countdown timer portion, and the control systems tool includes a tool replenishment timer portion, the tool replenishment timer portion replenishing the controller countdown timer portion so long as the controller device and the control systems tool are in communication, and wherein the controller device sends task information to the control systems tool so long as the controller countdown timer portion is not expired.

[c31] 31.The system according to claim 29, wherein the plurality of charts includes a primary chart having primary time slices and a secondary chart having secondary time slices, wherein tasks on the primary chart receive priority over tasks on the secondary chart, and wherein the user interface generation portion displays task information based on the primary chart and secondary chart.

[c32] 32.The system according to claim 31, wherein the plurality of charts further includes a tertiary chart having tertiary time slices, wherein tasks on the secondary chart receive priority over tasks on the tertiary chart, and wherein the user interface generation portion displays task information based on the primary chart, secondary chart and tertiary chart.

[c33] 33.The system according to claim 32, wherein the task adjustment portion adjusts the loading of a task by moving a task from one of the primary chart,

secondary chart or tertiary chart to another of the primary chart, secondary chart, or tertiary chart.

[c34] 34.The system according to claim 32, wherein the task adjustment portion adjusts the loading of a task by moving a task from one set of time slices of the primary chart, secondary chart or tertiary chart to another set of time slices of the same primary chart, secondary chart, or tertiary chart.

[c35] 35.A tool system for monitoring and scheduling tasks in an operating system, the tool system comprising:
 means for obtaining task information relating to tasks processed in the operating system;
 means for generating a user interface based on the obtained task information, the user interface displaying parameters related to the task information;
 means for determining loading of the operating system based on the user interface; and
 means for adjusting the scheduling of tasks based on the loading of the operating system.

[c36] 36.The tool system according to claim 35, wherein the means for generating a user interface represents processing time in the operating system, using a system of charts, the system of charts includes a plurality of charts that include:
 a primary chart having eight primary time slices, each of the primary time slices representing a time duration;
 a secondary chart having eight secondary time slices, each of the secondary time slices representing a time duration eight times as long as the time duration represented by each primary time slice; and
 a tertiary chart having eight tertiary time slices, each of the tertiary time slices representing a time duration eight times as long as the time duration represented by each secondary time slice.

[c37] 37.A tool system for monitoring and scheduling tasks in an operating system, the tool system comprising:
 means for obtaining task information relating to tasks processed in the operating system;

means for generating a user interface based on the obtained task information, the user interface displaying parameters related to the task information, the task information based on a system of charts, the system of charts including a plurality of charts;

means for determining loading of the operating system based on the user interface; and

means for adjusting the scheduling of tasks based on the loading of the operating system, wherein the operating system is a controller.